bridge to twenty-five miles per hour, much higher speed being frequently run; that while of opinion that the fall of the bridge was occasioned by the yielding of the cross bracing and fastenings, it might possibly have been due to the fracture of one of the outward leeward columns.

Col. Yolland and Mr. Barlow conclude by stating "that there is no requirement issued by the Board of Trade respecting wind pressure, and there does not appear to be any understood rule in the engineering profession regarding wind pressure in railway structures; and we therefore recommend that the Board of Trade should take such steps as may be necessary for the establishment of rules for that purpose."

Mr. Rothery, in his independent report, while stating that there is an entire agreement between himself and his colleagues in the conclusions arrived at from the evidence, goes further than them, and unhesitatingly apportions the blame among the different parties concerned. On the recommendation that the Board of Trade should establish rules providing for wind pressure, he differs from his colleagues, emphatically stating that it is for the engineering profession to make them, and evidently regards the superficial character of an official inspection as no great evil.

Where French engineers have long adopted 270 kilogrammes per square metre, and many English engineers, on the authority of Rankine, the equivalent 55 lbs. per square foot, while nearly the same figure is used in America, it seems strange that so much difference of opinion should be found to exist; but one thing at least is certain, that the instruments at present in use for measuring wind pressure are exceedingly crude and liable to error, and that until these are improved and much increased in number there is little chance of being on the spot when these excessive pressures occur, or of truthfully recording them when met with.

Respecting the transfer of these responsibilities to a Government Department, we believe that such apron-string policy would be fatal to the profession of the civil engineer; we would rather see the Board of Trade Inspection, which at least is formal and superficial, relaxed than any attempt made to increase its efficiency. The medical profession does not require a fatherly department to watch over its operations or give an opinion on an amputation; why then should the engineering profession? It cannot be too clearly understood that an engineering work cannot be successfully carried out by mere rule of thumb or even by the copious use of "Molesworth" or "Rankine"; each operation is to some extent a physical experiment subject to known laws, but under variable conditions. The physicist and the engineer have already to a great extent established the laws for him, but it remains for the scientific engineer to carefully watch their operation, and thus gain that practical experience which will enable him to deal with each special case as it arises.

The conclusions we draw from the evidence and report are that the design of the piers was most imperfect, cheapness appearing to be the ruling element in every detail, a cheapness too that must have been completely delusive, as any money saved in first cost would soon, in such a rickety structure, have been swallowed up in maintenance. At nearly all points an absence of consideration for small details is most apparent, indicating probably that these were intrusted to some subordinate, who failed to appreciate their importance.

It is very far from our object in this article to hold up any particular individuals to blame for this disaster, but we should like to point out on whom the responsibility should rest if such a thing should occur again.

It would be quite impracticable for the Board of Trade to exercise such supervision over the selection of the material and the execution and erection of a large work throughout its progress, as would render its certificate of any value; we believe, therefore, that the undivided responsibility should rest on the engineer. Any dishonesty on the part of the contractor or his workmen,—and we are sorry to believe this still exists in some cases,—could be easily rendered hazardous by legal penalties.

Doubtless with the keen competition of the present day things must be "cut finer" than they used to be; but while we would remove any arbitrary restrictions imposed by Government on the judgment of those who ought to be best able to appreciate the particular conditions of their own work, we should be very sorry to see the introduction of flimsy structures or reckless traffic arrangements without it being clearly understood on whom the responsibility rested in case of failure.

CAMPS IN THE CARIBBEES

Camps in the Caribbees. The Adventures of a Naturalist in the Lesser Antilles. By F. A. Ober. (Boston, U.S.: Lee and Shepherd; Edinburgh: Douglas, 1880.)

THE author of this lively and very entertaining book of travel undertook in 1876 the exploration of the Caribbees or Lesser Antilles, which islands extend over eight degrees of latitude between Porto Rico and Trinidad, connecting the Greater Antilles with the continent of South America. The islands had been hitherto little visited by naturalists, and the author made his expedition under the auspices of the Smithsonian Institution, with the especial object of collecting the birds of the group.

Around the borders of each island there is a cleared belt of fertile land, and on the coast often large villages and towns, whilst the interior is one vast forest covering wild hills and mountains. It was in the forests that the author's work lay. He took his camera into the mountains with him and photographed everything of interest which he met with, and the book is illustrated by numerous wood engravings of remarkably fine quality taken from the photographs and his sketches. About half the book, which is an octavo of 350 pages, describes adventures in the island of Dominica. Barbuda and Antigua were visited, but are not referred to at length. The account of the islands of St. Vincent, Grenada, Guadeloupe, and Martinique compose the remainder of the work, together with a catalogue of the birds of the group and descriptions of the sixteen new species of birds discovered.

Dominica was so named by Columbus, who happened to hit off the Lesser Antilles on his second voyage, because he sighted the island on a Sunday, November 3rd, 1493. The island is most beautiful. The hills are broken and ragged, seamed, furrowed, and scarred, yet covered with a luxuriant vegetation of every shade of green—purple of mango and cacao, golden of cane and lime—whilst the ridges are crowned with palms, and behind Roseau, the capital, rises Lake Mountain, four thousand feet in height, five miles distant from the town, yet seeming to overshadow it.

Mr. Ober started forthwith for the mountains, and settled himself in a cabin in the midst of the forest amongst the mountaineer population, which is of mixed race, partly negro, partly, Carib, partly European. Here the mountaineers' children waited on him, and brought him beetles and snails and humming-birds, which they caught with birdlime. But he had to dispense with their services, for they brought him far too many things of one kind, and especially huge land-crabs as big as a man's hand. He had incautiously remarked that he should like a specimen of this crab, which abounds in the ravines and rivulet banks. "Each boy and girl in the place resolved to be the first to furnish me with the coveted crab. The consequence was that my place was soon overrun with shell-fish—ugly red and yellow crabs, as large as a man's hand, and from that to the most diminutive. One of the girls in a mischievous mood brought in a crab with a family of little ones, over a hundred, just large enough to be seen, and let them loose on the floor. Through some open window, while I was absent, some giant crab would be dropped on the floor to await my arrival. This was not done in a spirit of mischief, but from an earnest desire to aid me in my labours. For a week I could not stir without coming in contact with a shelly creature. I could not put my foot out of bed without a shudder of apprehension. Of nights I would be awakened by the rattling of ale-bottles, and arising, would discover that some crab had got thirsty in the night and had inserted a claw, which had caught in the neck of a bottle." In the afternoon the author sat looking out through the loophole of this cabin, which served as a window, and surveyed the peaceful Caribbean Sea, with the same vessels to be seen sometimes becalmed under the lee of the Caribbee Islands day after day. The sea is, however, not always placid; in the "hurricane season" it rises in its wrath. It is disturbed, however, only by a hurricane; nothing less. In the mornings and evenings he explored the beautiful forests and stream-beds around his camp, gun on shoulder, and collected all he could find. Sometimes on these excursions he had merry companions, laughing girls combining Carib, French, and negro blood in their veins, and full of life and fun. Let us follow him with Marie and her friend in search of crayfish (we presume a species of Palæmon, the author unfortunately does not state). "The path is slippery, and we shall need a help from 'Marie's' hand, for the way leads up hill and over rocks wet and smooth, whilst wet leaves flap in our faces and creeping ferns and trailing plants hang on our feet as we go.

"We reach the river, the stream that flows out of the mountain lake, broad and with gravelly beach, with immense boulders as islands, and a wall of vegetation on either side that rises straight up a hundred feet. Here the two girls made into the stream in search of crayfish. The stream is broad with deep pools, and in these the crayfish lurked, looking like miniature lobsters in the clear water. We can see only the small ones, but Marie assures us that there are large ones out of sight beneath the cascades.

"Erect upon a rock she stood for a moment, then plunged head foremost into a foaming pool, disappearing from sight. A moment later rising bubbles preceded a round little head, from which hung long limp tresses; a pair of shoulders brown and bare, and round arms and little hands reaching out for a support. She had a crayfish in each hand, and another with wriggling legs in her mouth."

The following is an account of the method in which humming-birds are caught:—"Let us follow little Dan, the oldest and sharpest of the humming-bird hunters, as he goes out for birds. First he goes to a tree called the mountain-palm, which replaces the cocoa-palm in the mountains, the latter growing only along the coast. Beneath the tree are some fallen leaves fifteen feet in length; these he seizes and strips, leaving the midrib bare, a long slender stem tapering to a point. Upon this tip he places a lump of bird-lime, to make which he had collected the inspissated juice of the bread fruit and chewed it to the consistency of soft wax. Scattered over the Savanna are many clumps of flowering bushes, over whose crimson and snowy blossoms humming-birds are dashing, inserting their beaks in the honeyed corollas, after active forays resting upon some bare twig, pruning and preening their feathers. Cautiously creeping toward a bush upon which one of these little beauties is resting, the hunter extends the palm-rib with its treacherous coating of gum. The bird eyes it curiously but fearlessly as it approaches his resting-place, even pecking at it; but the next moment he is dangling helplessly, beating the air with buzzing wings in vain efforts to escape the clutches of that treacherous gum."

Mr. Ober tried hard to keep humming-birds alive, but, as usual, without success. They never survived many days. If exposed to the light they kept up a constant fluttering, until the muscles of their wings became so stiff they could not close them, but expired with the wings widely outstretched. "Every morning I would introduce into the cage a bough of fragrant lime-blossoms, at which they would all dash instantly, diving into the flowers with great eagerness. Sugar dissolved in water and diluted honey was their favourite food, and they would sip it greedily. Holding them by their feet I would place their beaks in a bottle of syrup, when they would rapidly eject their tongues and withdraw them, repeating this operation until satisfied. They never displayed fear, but would readily alight on my finger and glance fearlessly up at me, watching an opportunity, however, for escape."

The boiling lake of Dominica was visited and photographed by the author. It was remarkably quiet during his visit, showing only a slight movement in the centre. The margin showed traces of the recent subsidence of the water-level, and on the following day the water had risen again somewhat, and was more active. It appears that the ebullition must be intermittent, but Mr. Ober did not see it in full action, though the water rose further, and the disturbance and noises continued to increase. The temperature of the water was only 96° F., though Dr. Nicholls, one of the party who discovered the lake, found it at 196° F., and Mr. Prestoe, of the Botanic Gardens of Trinidad, from 180° to 190°. The author follows Mr. Prestoe in the expectation that by the widening and deepening of the outlet the lake will disappear in time, and a geyser alone remain. In a boiling spring hard by the author and his guides cooked their supper of wild yams and eggs, and, as usual, cold water for drinking was found also close at hand.

An interesting account of the Caribs of Dominica follows. They have allotted to them a reservation extending from Mahoe River to Crayfish River, a distance of about three miles along the Atlantic coast and away back into the mountains as far as they please to cultivate. Though each family has a little garden near the house, all the "provision grounds," where staple articles of food are grown—yams, sweet potatoes, cassava, bananas, and taro—are at a distance from the houses, some even two miles away—solitary openings made in the depths of the high woods. The Caribs are especially interesting as being the earliest American savages met with by Columbus, the original "cannibals," and the race to which Caliban and Man Friday belonged. They seem somewhat addicted to drinking now, for the author describes the old King George the Third as seen tottering towards the plantation with a sovereign he had earned in his hand to spend it in rum. A lot of drunken Caribs tried to break into the author's house one night for amusement, and not being able to do that, poked a lot of fireflies in at the cracks to light up the inside, and see for certain whether he was at home—a very neat way of lighting up an interior. The general account of the Caribs is well worth reading.

We cannot follow the author in his exciting hunt after the souffrière bird, which lives only about the crater of the island of St. Vincent. The wary bird when at last procured proved to be of a new species, *Myadestes sibilans*. In Antigua he was victimised by the well-known "jigger." "I awoke one morning with an itching of my toes, which frequent rubbing failed to allay, and examination revealed four white tumours. They were as large as peas, and in the centre of each was a little black speck. I called my boy William, who at once pronounced them jiggers." The first old negress passing was called in, and turned them out of their nests with an adroitness which showed long practice. "A few hours are sufficient to give the jigger a hiding-place, and as the sensation he causes is a rather pleasant itching only for a time, he is sometimes not discovered till a painful sore is formed."

At Dominica the author met with Dr. Miroy, a friend and correspondent of Sir Joseph Hooker, and who is endeavouring, through the aid of the Kew establishment, to re-introduce the cultivation of coffee into the island. He is cultivating Liberian coffee, in the hope that it will prove able to withstand the attacks of blight which ruined the former crops forty years ago.

In Grenada the author hunted the monkeys which abound there as at St. Kitts, having been of course introduced, and having run wild, as explained in a series of letters in NATURE some months ago. He could not, however, make up his mind to shoot one when it came to the point. The monkeys are a great pest, and do great damage to the cultivator, just as in St. Iago, Cape Verde Islands, on the other side of the Atlantic, where also they were doubtless introduced, though it is not as yet known what the species is.

The book ends with an account of an ascent of the Guadeloupe Souffrière. It is throughout entertaining and highly amusing, but the author is evidently not very deeply versed in natural history, and there is often to be noted a lack of precise information, as in the case, for example, of the crayfish, cited above. The account of the land-crabs is somewhat conflicting. At one place we read of a mother-crab, with 100 tiny young, found far up in the mountains, at another, where the author falls in with an army of land-crabs on their combined march to the sea; he tells us that they bury their eggs under the sand, where they are hatched, and soon after millions of the new-born crabs are seen quitting the shore and slowly travelling up the mountains.

The story which he tells of the habits of the huge Hercules beetle, *Dynastes hercules*, can hardly be accepted as it is by the author on the authority of his dusky guide. It is that the male beetle seizes a small branch of a tree between its enormously long nippers and buzzes round and round the branch till this is cut off, producing a knife-grinding sound, supposed by the author to be a sexual call. He heard a knife-grinding noise indeed, but he did not see the rotating beetle. We recommend the book to all our readers.

A NEW ENGLISH TEXT-BOOK OF BOTANY

An Elementary Text-book of Botany. Translated from the German of Prof. K. Prantl. Revised by S. H. Vines, M.A., D.Sc., F.L.S. (London: Sonnenschein and Allen, 1880.)

THIS text-book, we are informed in the English preface, "was written by Prof. Prantl, to meet a growing demand for a work on botany, which, while less voluminous than the well-known work of Sachs, should resemble it in its mode of treatment of the subject, and serve as an introduction to it." While we already have in English many text-books for students, one indeed almost professedly taking the same line as this, every teacher must have felt how inadequately they supply the needs of the class for which they have been written. Most are new editions of books written first twenty years ago or more, and suffer from the impossibility of introducing those new facts which have so deeply modified our present standpoint, without damaging the symmetry and unity of a well-written work; and others, of more recent origin, are badly compiled or over-concentrated. The book before us, avoiding these faults, will unquestionably take a high place at once; for though using Sachs as his storehouse, the author has digested the strong meat of the big book, and here provides his readers with the milk suited to their years. Moreover, the book is singularly well-balanced in all its parts, and clearly-written throughout. The translation is so flowing that no reader uninformed of the fact would guess that German was the original dress; and Mr. Vines has added to the value of the work by appending a table, in which the classification there adopted is compared with that of Bentham and Hooker.

A reference to those knotty points to which one always looks at once as tests of successful treatment has proved so satisfactory that it is with regret that we turn to the ungracious task of pointing out the deficiencies that will somehow creep into the most carefully-written books. In several points Prantl has followed Sachs too closely, so that the accounts of cell-division, of the morphology of the pollen-grain and ovule, of the growing-point of Phanerogams, are all far behind our present knowledge. Again, in the treatment of "Modes of Branching," Sachs has been followed rather than Hofmeister, who, despite his complex sentences, gives a much clearer exposition.